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E. P. WAITE

2,727,280

TOP ROLL FOR FIBER ATTENUATING APPARATUS

Filed June 5, 1953

2 Sheets-Sheet 1

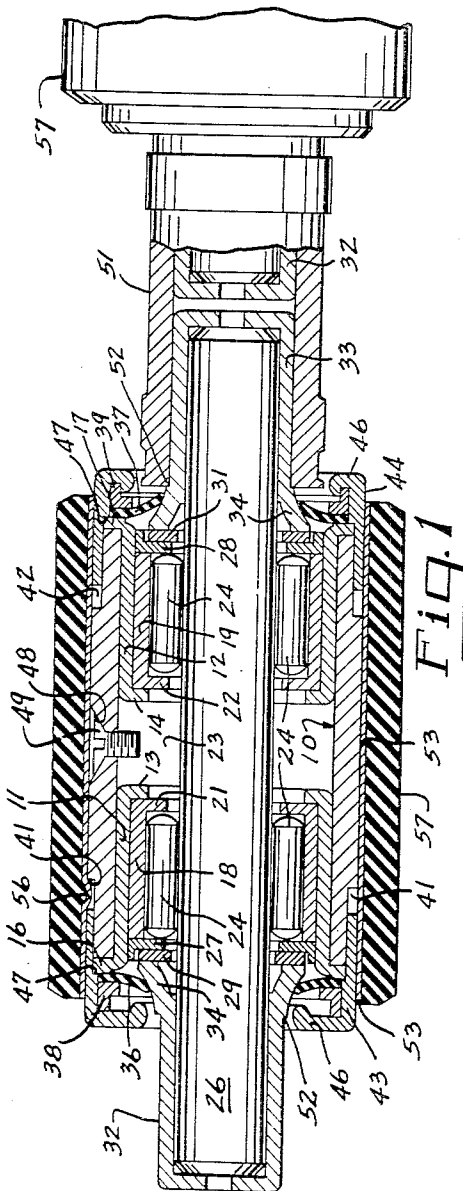


Fig. 1

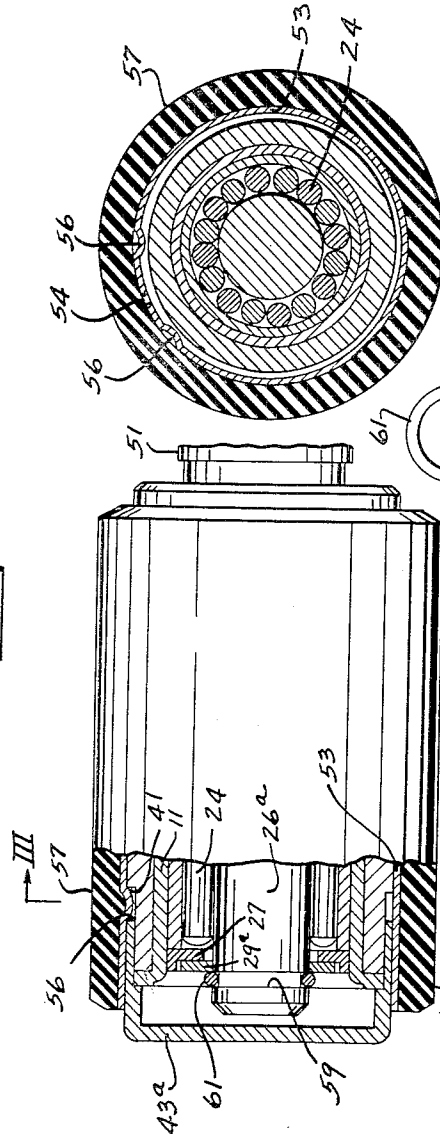


Fig. 2

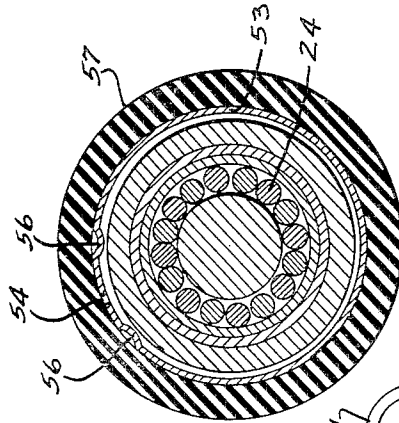


Fig. 3



Fig. 4

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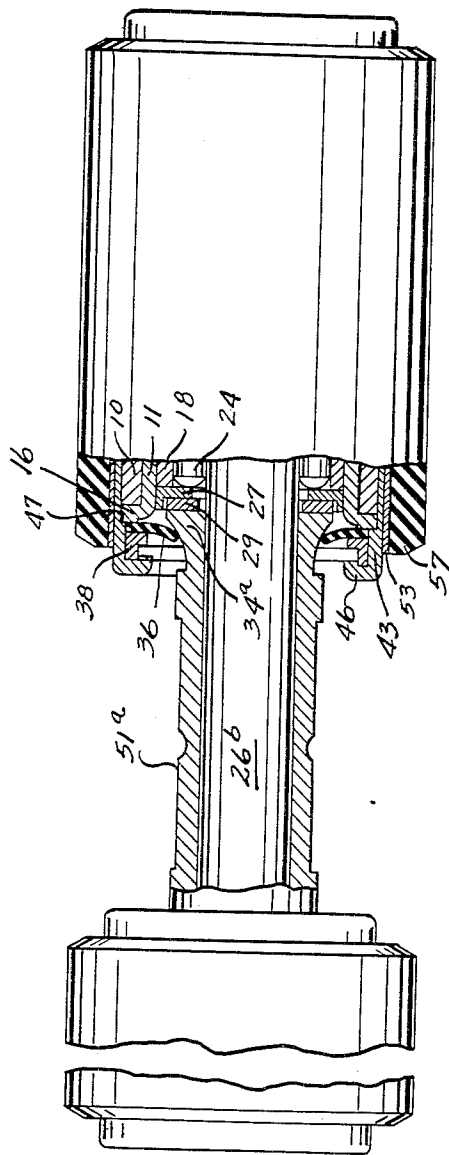


Fig. 5

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TOP ROLL FOR FIBER ATTENUATING APPARATUS

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15 Claims. (Cl. 19—142)

This invention relates to a top roll for fiber attenuating apparatus such as drawing frames, spinning frames, roving frames, slubbers, and the like and is an improvement over the general type of top roll described and claimed in my Patent No. 2,621,374, issued December 16, 1952.

A primary object of my invention is to provide a top roll for fiber attenuating apparatus which shall embody an improved tension type seal effective to retain lubricant within the bearing areas and prevent the entry of foreign matter thereinto, thus resulting in greater precision and longer trouble-free life for the roll.

Another object of my invention is to provide a top roll of the character designated which shall embody simple means for relubricating the bearings thereof without disassembly.

A still further object of my invention is to provide a top roll of the character designated which shall be flexible in design, thus adapting the same for variations in length and spacing to duplicate the various sizes of solid type rolls now in use and whereby with other modifications it is adapted for use in modern type frames which employ arms to which the top rolls are attached, thus eliminating roll end caps and slotted cap bars which have been employed heretofore to hold the rolls in position.

Briefly my improved top roll embodies a cylindrical barrel rotatably mounted on a spindle by means of roller bearings. A removable cot is mounted on the barrel by means of a split shell member which fits with tension around the barrel and is retained thereon by depressions in the shell that engage a recess on the barrel. A flexible washer-shaped seal is attached adjacent its outer circumference to the barrel with the inner circumference thereof bearing slidably against a member concentric with the spindle. Lubricant is added to the bearings, at long intervals of service, by providing an oil inlet in the barrel intermediate the bearings.

Top rolls embodying features of my invention are illustrated in the accompanying drawing forming a part of this application in which:

Fig. 1 is an elevational view of a top roll made in accordance with my invention, partly broken away and in section;

Fig. 2 is an elevational view, partly broken away and in section, showing a slightly modified form of my invention;

Fig. 3 is a sectional view taken on the line III—III of Fig. 2;

Fig. 4 is an elevational view of the circular spring which serves to lock the thrust washer shown in Fig. 2; and,

Fig. 5 is an elevational view, partly broken away and in section, showing a still further modified form of my invention.

Referring now to the drawing for a better understanding of my invention, I show a cylindrical barrel 10. Pressed within opposite ends of the barrel 10 are cylindrical bearing holders 11 and 12 having inturned annu-

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lar flanges 13 and 14 at the inner ends thereof and out-turned annular flanges 16 and 17 at the outer ends thereof respectively. The out-turned flanges 16 and 17 engage the outer ends of the barrel 10 thereby accurately positioning the holders 11 and 12 therein. Pressed into the bearing holders 11 and 12 are cylindrical bearing races 18 and 19 having inturned annular flanges 21 and 22 respectively at the inner ends thereof which form roller retainers. The flanges 21 and 22 give added strength to the races 18 and 19 and are spaced axially from each other so as to provide a space 23 for receiving a lubricant when the roll is assembled.

Mounted within each of the races 18 and 19 are a plurality of rollers 24. Passing through the barrel 10 and contacting the rollers 24 is a spindle 26. It will be noted that the spindle 26 does not contact the inturned flanges 21 and 22, thus providing a passageway for lubricant to feed to the rollers. To limit lateral movement of the rollers 24 and the bearing races 18 and 19, retaining washers 27 and 28 are pressed snugly into the outer ends of the bearing holders 11 and 12 respectively. Surrounding the spindle 26 and bearing against the retaining washers 27 and 28 respectively, are thrust washers 29 and 31.

Pressed over the ends of the spindle 26 are cup-shaped end caps 32 and 33 which flare outwardly adjacent the inner ends thereof, as at 34 for a purpose to be described hereinafter. The inner ends of the end caps bear against the thrust washers 29 and 31 respectively with a close running fit, thus locking the unit together.

Surrounding the end caps 32 and 33 and slidably engaging the flared portion 34 thereof are annular sealing members 36 and 37 respectively. Preferably, the sealing members are formed of a resilient material, such as oil resistant rubber moulded on each side of a woven material. Fitting against the outer surface of the sealing members 36 and 37 adjacent the outer circumference thereof are annular lock members 38 and 39.

The outer surface of the barrel 10 is provided with recesses 41 and 42 at opposite ends thereof for receiving, with a press fit, annular cup-shaped housing members 43 and 44 respectively. The housing members 43 and 44 have inturned flanges 46 adjacent the outer ends thereof which engage the lock members 38 and 39, thus holding them in place against the sealing members. To limit inward movement of the housing members 43 and 44 and to obtain the desired pressure on the sealing members 36 and 37 internal shoulders 47 are provided on the housing members 43 and 44 which engage the out-turned flanges 16 and 17 of the bearing holders. As shown in Fig. 1 the inside diameters of the lock members 38 and 39 are smaller than the inside diameters of the portions of the annular flanges 16 and 17 which bear against the sealing members 36 and 37, thus permitting the inner edges of the sealing members to be forced against the flared portions 34 of the end caps with the desired tension.

To relubricate the bearings after long intervals of service, a threaded opening 48 is provided in the barrel intermediate the annular flanges 21 and 22 of the bearing races. Fitting within the opening 48 is a threaded flat head plug 49, the upper surface of which lies below the outer surface of the barrel.

The assembly described above constitutes a roll unit, with the exception of the cot. To form a complete top roll a connecting sleeve member 51 is pressed over the end caps 32 and 33 of adjacent units. Inward movement of the sleeve member 51 is limited by a shoulder 52 formed on the outer surface of the end caps.

Fitting over the barrel 10 is a sleeve member or shell 53 having an inner diameter slightly smaller than the outer diameter of the barrel 10 and housings 43 and

44. The shell 53 is slit longitudinally as at 54 and is provided with one or more inwardly extending depressions 56. As shown in Fig. 1, the housings 43 and 44 terminate short of the inner ends of the recesses 41 and 42, thus leaving an annular recess for receiving the depressions 56. While I show the depressions 56 as fitting in the recesses 41 and 42, it will be apparent that other grooves may be provided in the surface of the barrel 10 for receiving the depressions.

Secured to the shell 53 by any suitable means, such as by cement, is a cot 57 formed of a suitable material such as rubber, leathers, a molded composition or a synthetic combination. Preferably, the outer surface of the shell 53 is provided with a sand blast finish to receive the cement while the inner surface thereof is smooth. The longitudinally extending slit 54 allows the shell to expand, thus permitting the depressions 56 to be pressed over the housings 43 and 44 into the recesses 41 and 42. After the depressions 56 move into the recesses, the shell 53 contracts and the inner surface thereof fits with tension around the barrel 10 and housings 43 and 44. With the shell thus attached to the barrel, more than normal operating pressures are required to move it with relation to the barrel.

In Fig. 2, I show a slightly modified form of my invention in which the top roll is adapted for use on frames where means of end support or alignment of the roll are not provided. The top rolls of such frames are held in place by means of arms which are attached adjacent the center of the shaft between the cots. The sealing member 36, lock member 38 and the end cap 32 are eliminated. The spindle indicated at 26a is shorter than spindle 26 and is provided with an annular groove 59 adjacent a thrust washer 29a for receiving a circular spring member 61 formed of a resilient material such as spring steel wire. The spring member 61 bears against the thrust washer 29a so as to limit lateral movement of the barrel. The thrust washer 29a fits about the spindle 26a with a close running fit.

Pressed over the end of the barrel and frictionally engaging the recess 41 is a cup-shaped housing member 43a which seals that end of the unit with a fluid tight fit. The end cap 33 is pressed into the sleeve member 51 as described above and in all other respects the construction is the same as that shown in Fig. 1 of the drawing.

In Fig. 5 I show a further modified form of my invention in which the spindle indicated at 26b is of a length to extend through adjacent rolls, thus forming a single continuous spindle for the rolls. While this type of spindle is adapted for use on rolls having end caps 32 and 33 at opposite ends thereof, I find that it is particularly adapted for use on rolls having no end caps at the outer ends thereof due to the fact that such rolls are supported only at the center and the continuous spindle maintains the roll in absolute alignment and reinforces the spindle between the barrels.

Fitting over the spindle 26b is a spacer sleeve member 51a having outwardly flared portions 34a at opposite ends thereof against which the flexible seals 36 and 37 bear. By this construction the center end caps are eliminated. In assembling the roll the lock members 38 and 39 and the housing members 43 and 44 are positioned on the sleeve member 51a inwardly of the flared portions 34a and the flexible seals 36 and 37 are slipped over the flared portions. The lock members and the housing members are then assembled as described above, thus securing the flexible seals in position.

From the foregoing it will be seen that I have devised an improved top roll for fiber attenuating apparatus. By attaching the sealing members 36 and 37 adjacent the outer circumferences thereof to the barrel with the inner surfaces thereof slidably engaging the flared portion of the end caps, a more positive seal is made. This construction is particularly advantageous in view of the

fact that the centrifugal force exerted by the rotary motion of the barrel tends to throw the lubricant away from the shaft and the flared portion of the end caps. Accordingly, less tension is required between the sealing members and the end caps, thus resulting in less friction and assuring longer trouble free life for the bearings. Also, the provision of removable cots which do not vibrate or creep greatly simplifies the buffing and replacement of top rolls. A long life for the bearings is assured further by providing a grease reservoir together with means for adding lubricant after long intervals of service.

While I have shown my invention in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What I claim is:

1. A top roll for fiber attenuating apparatus comprising a spindle, a cylindrical barrel assembly mounted for rotation on each end of the spindle, an outwardly tapered member surrounding the spindle adjacent at least one end of each of said barrel assemblies, thrust elements in the assembly inwardly of said tapered member limiting axial movement of the barrel assembly relative to the spindle, an annular flexible sealing member surrounding said outwardly tapered member stressed to assume a conical shape with its inner peripheral edge pressed axially against said tapered member, and means securing said sealing member along its outer edge to the said barrel assembly adjacent the end thereof.

2. Apparatus as defined in claim 1 in which the spindle is unitary and in which a spacer sleeve surrounds the spindle between the barrel assemblies and is provided with outwardly tapered end portions adjacent the barrel assemblies.

3. Apparatus as defined in claim 1 in which the spindle is in two parts with a connecting sleeve member joining the parts together.

4. A top roll for fiber attenuating apparatus comprising a spindle, a cylindrical barrel assembly mounted for rotation on said spindle, cup shaped end cap members pressed over opposite ends of said spindle and having outwardly flaring portions adjacent the open ends thereof, thrust elements inwardly of said end caps limiting axial movement of the barrel assembly relative to the spindle, annular flaring sealing members surrounding said end cap members and stressed to bear axially against said outwardly flaring portions with a sliding fit, and means securing said sealing members adjacent their outer perimeters to the ends of said barrel assembly.

5. A top roll for fiber attenuating apparatus comprising a cylindrical barrel having a spindle extending there-through, cylindrical bearing retainer members pressed into opposite ends of said barrel, inturned flanges at the inner ends of said retainer members, out-turned annular flanges at the outer ends of said retainer members engaging the ends of said barrel, rollers within said retainer members, there being a space defined between said inturned flanges of the retainers for receiving lubricant and a space defined between said inturned flanges and the spindle for feeding the lubricant to the rollers, washers surrounding said spindle and bearing against the bearing retainer members to limit lateral movement of said rollers, and sealing means between said spindle and the ends of said barrel retaining the lubricant within the bearing areas and preventing the entry of foreign matter thereinto.

6. A top roll for fiber attenuating apparatus as defined in claim 5 in which the sealing means comprises outwardly tapered portions on the spindle adjacent the ends of the barrel, annular sealing members surrounding and bearing against said tapered portions with a sliding

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fit, and means securing said sealing members adjacent their outer perimeters to the ends of said barrel.

7. A top roll for fiber attenuating apparatus as defined in claim 6 in which an opening is provided in the barrel intermediate the inturned flanges of the bearing races for introducing lubricant.

8. A top roll for fiber attenuating apparatus comprising a cylindrical barrel having a spindle extending there-through, cylindrical bearing holders pressed into opposite ends of said barrel, inturned annular flanges at the inner ends of said holders, out-turned annular flanges at the outer ends of said holders engaging the ends of said barrel, cylindrical bearing races within said holders having inturned annular flanges at the inner ends thereof, rollers within said bearing races, retaining washers pressed within the outer ends of said bearing holders and bearing against the bearing races to limit lateral movement of said rollers, thrust washers surrounding said spindle and bearing against the retaining washers, and cup-shaped end cap members pressed over the ends of said spindle and contacting said thrust washers with a close running fit.

9. A top roll for fiber attenuating apparatus as defined in claim 8 in which a connecting sleeve member fits over the end caps of adjacent rolls, thus joining a plurality of top roll assemblies.

10. A top roll for fiber attenuating apparatus as defined in claim 8 in which the end cap members have outwardly flared portions adjacent the open ends thereof and annular flexible sealing members surround the outwardly flared portions with a sliding fit and are secured adjacent the outer perimeters thereof to the out-turned flanges of the bearing holders.

11. A top roll for fiber attenuating apparatus as defined in claim 10 in which the sealing members are secured to the out-turned flanges of the bearing holders by means of cup-shaped housing members which are pressed over opposite ends of the barrel.

12. A top roll for fiber attenuating apparatus comprising a cylindrical barrel having a spindle therethrough, cylindrical bearing holders pressed into opposite ends of said barrel and having out-turned annular flanges at the outer ends thereof engaging the ends of said barrel, cylindrical bearing races within said bearing holders and having in-

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turned annular flanges at the inner ends thereof, rollers within said bearing races, retaining washers pressed within the outer ends of said bearing holders and bearing against the bearing races, thrust washers surrounding said spindle and bearing against the outer surface of said retaining washers, cup-shaped end caps having outwardly flaring open ends pressed on opposite ends of said spindle and contacting said thrust washers with a close running fit, annular flexible sealing members bearing against said out-turned flanges on the bearing holders and surrounding the inner ends of said end cap members with a sliding fit, annular lock members adjacent the outer circumferences of said sealing members, there being recesses in the outer surface of said barrel at opposite ends thereof, and cup-shaped housing members disposed to fit over the ends of said barrel in said recesses and bear against said lock members.

13. A top roll for fiber attenuating apparatus as defined in claim 12 in which the inside diameters of the lock members are smaller than the inside diameters of the portions of said out-turned annular flanges which bear against said sealing members.

14. A top roll for fiber attenuating apparatus as defined in claim 12 in which the cup-shaped housing members are provided with shoulders on the inner surfaces thereof which engage the out-turned flanges of the bearing holders, thus limiting inward movement of the housing members.

15. A top roll for fiber attenuating apparatus as defined in claim 12 in which a split shell member having a cot secured to the outer surface thereof is pressed over the barrel and in which the shell member is provided with inwardly directed depressions which fit in the recesses in said barrel.

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